REMARKS

The Applicants respectfully request further examination and reconsideration in view of the remarks below. Previously, Claims 1-32 were pending in the application, of those Claims 1-32 were rejected. Accordingly Claims 1-32 are pending.

Request for Consideration of IDS

The supplemental electronic IDSs filed January 26, 2005 and February 1, 2005 have not been considered. The Applicant realizes that these IDSs were submitted too close to the mail date of the Office Action mailed February 1, 2005 for consideration within the Office Action; accordingly, this is merely a request to consider these IDSs within the next Office Action.

Claim Rejections Under 35 USC §103

Claims 1-32 stand rejected under 35 USC §103(a) as being unpatentable over "Modeling of Two-Phase Microchannel Heat Sinks for VLSI Chips" by Koo et al. ("Koo"), in view of at least U.S. Patent Publication US 2002/0121105 to McCarthy et al. ("McCarthy"). Several of the Claims are rejected in further view of one or more of the following: U.S. Patent 6,182,742 to Takahashi et al. ("Takahashi"), U.S. Patent Publication US 2003/0121274 to Wightman ("Wightman"), U.S. Patent Publication US 2004/0089008 to Tilton et al. ("Tilton"), U.S. Patent 6,775,996 to Cowans ("Cowans"), U.S. Patent Publication 2004/0040695 to Chesser et al. ("Chesser"), U.S. Patent 6,023,934 to Gold ("Gold"), and "A Closed-Loop Electroosmotic Microchannel Cooling System for VLSI Circuits" by Jiang et al. ("Jiang"). The Applicants respectfully traverse the rejections within the Office Action and submit that the various combinations of references relied upon within the Office Action do not make obvious the instant invention, as further outlined below.

The primary reference combination relied upon to show obviousness of the claimed invention was that of Koo over McCarthy as applied to Claim 1. Within the Office Action, it is stated (FIG. references omitted),

> Koo discloses applicant's basic inventive concept, a method of cooling a heat-generating device using a pump to cause a fluid to flow in a heat exchanger and having a heat rejector, substantially as claimed.

The Office Action further contends,

> [Koo does not state] specifically that the pressure of the refrigerating fluid is adjusted in the system to correspondingly adjust the boiling point temperature of the fluid in the heat exchanger.

The literal teaching of figure 1 of Koo, disclosing an IC chip cooled by a microchannel heat exchanger through which fluid is pumped, can perform a method similar to that recited within the first subparagraph of Claim 1: using a pump to cause fluid to flow in a heat exchanger. However, Koo does not teach, hint or suggest that a pressure of the fluid is adjusted to adjust a boiling point temperature of the fluid in the heat exchanger.

Further, McCarthy, though relied upon as doing so within the Office Action, also does not teach that a pressure of a fluid within a cooling system is adjusted to correspondingly adjust a boiling point temperature of the fluid within a heat exchanger. McCarthy recognizes the correlation between boiling point temperature and pressure common in many fluids, but this recognition does not constitute a teaching, hint or suggestion that the fluid pressure be adjusted to correspondingly adjust the boiling point temperature of the fluid.

McCarthy teaches a "closed loop" cooling system incorporating a venturi having a venturi throat coupled to an expansion tank of predetermined pressure. [Paragraph 0041] In each embodiment taught by McCarthy, the "closed loop" cooling system is actually an open loop, having a conventional throat (45 or 45') exposed to atmosphere. The inclusion of the venturi allows determination of the fluid velocity within the system by measuring the pressure at the venturi throat and the conventional throat in the system exposed to atmospheric pressure. [Paragraph 0044] As fluid passes through a venturi it accelerates, and its pressure decreases due to Bernoulli's principle. Venturi-constricted flow achieves lowest pressure at the narrowest point of the venturi. For a given flow rate, by exposing fluid flowing through the narrowest point of the venturi to a predetermined pressure, the system of McCarthy effectively sets the pressure of the rest of the system. [Paragraph 0059]

Further, McCarthy states that,

> An advantage of this invention is the venturi causes higher pressures and therefore, a higher operating fluid temperature without boiling. [Paragraph 0043]

Notwithstanding the validity of the causative mechanism expressed in the above sentence, it is a recognition that higher fluid pressures correspond to higher boiling temperatures. However, the correlation between pressure and boiling temperature is well-established, and its recognition within McCarthy no more illuminating than a glance at a common phase diagram, nor does it prove the allegation made within the Office Action that,

> McCarthy shows [that] adjusting the pressure of the refrigerating fluid in the system to correspondingly adjust the boiling point temperature of the fluid in the heat exchanger [is] old in the refrigeration art.

Since the correlation between boiling point temperature and fluid pressure is established, in order to teach adjustment of the pressure within the system to adjust the boiling point temperature, McCarthy must teach adjustment—changing during or prior to operation—of the pressure within the system; McCarthy does not so teach. In McCarthy, the boiling point is predetermined by selection of the venturi characteristics, flow rate, and expansion tank pressure. These aspects of the system are not adjusted during or prior to operation as disclosed in McCarthy.

First, the inclusion of a venturi in a system does not constitute an adjustment. Three points should be noted regarding the operation of the venturi: first, the comparative statements made within McCarthy are made with reference to system having only a conventional throat coupled to an expansion tank, second the venturi does not itself "cause higher pressures," but instead forces the pump to form a higher fluid pressure within the system to achieve a given flow rate than would be necessary if the venturi were not included, third, the maximum pressure allowable within the system is predetermined by the configuration of the throats, the venturi and the pressure tank. Because the configuration of the throats, the venturi and the pressure tank are not changeable, there is no adjustment of the fluid pressure within McCarthy.

Second, the expansion tank pressure is not adjusted within McCarthy. The expansion tank pressure is repeatedly referred to as 'predetermined.' So, because the reservoir pressure is predetermined, the operating pressure of the cooling system is determined by the flow rate of the fluid within the system. The flow rate and the pressure are correlated. The pressure is not adjusted.

Third, the flow rate is not adjusted within the system of McCarthy, instead the pump is set to achieve a predetermined flow rate, assuming initial pressure conditions. McCarthy does not disclose adjusting the flow rate using the pump, and hence does not disclose adjusting the pressure within the system. Several aspects of the disclosure of McCarthy suggest that the flow rate is not actively controlled, but instead the pump power is pre-set and the true flow rate depends on pressure conditions within the system: the system includes switches for measuring the true flow rate, but no feedback is provided from these switches to the pump system; and the only references to setting the flow rate regard predetermined rates. [Paragraphs 45, 49]

In operation, the device of McCarthy uses a pressure switch coupled to the venturi to determine the pressure (and thereby the flow rate) within the system. [Paragraphs 49, 50, 63-66] A predetermined pressure is set to trigger switching of the heat generating device via an ECU. [Paragraphs 45, 49, 66, 72] According to McCarthy, the only adjustment made in response to

changes in pressure, i.e. flow rate, is the switching of the heat generating device. Accordingly, there is no teaching, hint or suggestion within McCarthy to *adjust* the flow rate within the system to control boiling temperature (or for any other reason) .

There is no discussion, hint, or teaching within McCarthy to adjust the configuration of the venturi, the pressure within the expansion tank, or the flow rate and thus to *adjust* the pressure of the fluid within the system to correspondingly *adjust* the boiling point temperature of the fluid in the heat exchanger. Accordingly, McCarthy fails to establish that adjusting a pressure within a heat exchanger system to correspondingly adjust the boiling point within the system is old in the refrigeration art.

The requirements for establishing a *prima facie* case of obviousness are well settled, [MPEP §2143]

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.
> Using the cited references, a *prima facie* case of obviousness has not been established.

As shown above, McCarthy does not present a device which teaches or suggests the claim limitation expressed in subparagraph two of the first Claim of the present invention: "adjusting a pressure of the fluid to correspondingly adjust a boiling point temperature of the fluid in the at least one heat exchanger." Hence, the combination of Koo and McCarthy fails to teach or suggest all the claim limitations.

Specifically, Claims 1 and 4 are rejected as being as being obvious over Koo in view of McCarthy. Claim 1 describes a method of cooling at least one heat-generating device using a cooling system. The method includes the steps of using at least one pump to cause a fluid to flow in at least one heat exchanger; and adjusting a pressure of the fluid to correspondingly adjust a boiling point temperature of the fluid in the at least one heat exchanger. As described above, the combination of Koo and McCarthy do not teach or suggest a system in which a pressure of a fluid is adjusted to correspondingly adjust a boiling point temperature. For at least these reasons, Claim 1 is allowable over the teachings of Koo in view of McCarthy.

Claim 4 depends from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claim 4 is allowable as being dependent from an allowable base Claim.

Claims 2, 27, and 28 are rejected over Koo in view of McCarthy as applied to Claim 1 and further in view of Takahashi. Claims 2, 27 and 28 depend from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 2, 27, and 28 are allowable as being dependent from an allowable base Claim.

Claims 3, 14-21, 26, 31 and 32 are rejected over Koo in view of McCarthy as applied to Claim 1 and further in view of Wightman. Claims 3, 14-21, 26, 31 and 32 depend from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 3, 14-21, 26, 31 and 32 are allowable as being dependent from an allowable base Claim.

Claims 5-7 and 9-11 are rejected over Koo in view of McCarthy and further in view of Tilton. Claims 5-7 and 9-11 depend from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 5-7 and 9-11 are allowable as being dependent from an allowable base Claim.

Claim 8 rejected over Koo in view of McCarthy as applied to Claim 1 and further in view of Tilton as applied to Claim 5, and still further in view of Cowans. Claim 8 depends from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 8 is allowable as being dependent from an allowable base Claim.

Claims 12 and 13 are rejected over Koo in view of McCarthy as applied to Claim 1 and further in view of Chesser. Claims 12 and 13 depend from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 12 and 13 are allowable as being dependent from an allowable base Claim.

Claims 22 and 25 are rejected over Koo in view of McCarthy as applied to Claim 1 and further in view of Gold. Claims 22 and 25 depend from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 22 and 25 are allowable as being dependent from an allowable base Claim.

Claims 29 and 30 are rejected over Koo in view of McCarthy as applied to Claim 1 and further in view of Jiang. Claims 29 and 30 depend from Claim 1, which is allowable over Koo in view of McCarthy for the reasons presented above. Thus, Claims 29 and 30 are allowable as being dependent from an allowable base Claim.

For the reasons given above, the Applicant respectfully submits that the pending Claims are in a condition for allowance, and allowance at an early date would be appreciated. If the Examiner has any questions or comments, he is encouraged to call the undersigned at (408) 530-9700 so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
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CERTIFICATE OF MAILING (37 CFR§ 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

HAVERSTOCK & OWENS LLP.

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